## Document #57 Webb, Chris City of Blanding, City Manager

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# Comments From the City of Blanding
# A Cooperating Agency
# Represented by City Manager Chris Webb
# 1/27/05

• To leave the tailings capped in place does not eliminate the potential damage to the river or surrounding property.

• Nor does it stop the river from continuing its move toward the contaminated pile.

• It appears that leaving it in place would only be a temporary solution with little to no investment return trade-off.

• No alternative provides the same investment return that the slurry line option does, even if the IUC alternative is not the cheapest. Besides the economic impacts that benefit the community and the benefits of recycling and extracting the remaining minerals in the tailings will have, the project can tie directly into solving a culinary water shortage that has been plaguing San Juan County in consistent cycles, costing the federal government millions of dollars in drought mitigation over the years.

• Why are we proposing to create a new site when the IUC site is in place. This makes no sense.

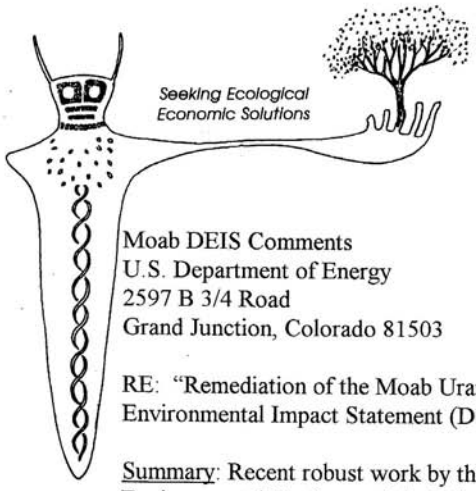
• We were not only shocked but dismayed at the lack of understanding regarding the issues of public safety. Emotions are high and misunderstanding too numerous to number.

• We have full confidence that the DOE has the ability to provide the necessary regulatory standards to ensure public safety and environmental compliance.

• Our education from Utah's Department of Environmental Quality gives us added confidence that the process can be handled safe both publicly and environmentally and that the associated risks are minimal if not non-existent.

• We encourage a full education program regarding the associated risks so that the public can come to the same conclusions.

## Document #58 Christie, Richard Lance Association for the Tree of Life

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**ATL**
***Association for the Tree of Life***
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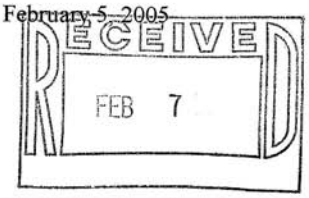
February 5, 2005




Moab DEIS Comments
U.S. Department of Energy
2597 B 3/4 Road
Grand Junction, Colorado 81503

RE: "Remediation of the Moab Uranium Mill Tailings, Grand and San Juan Counties, Utah, Draft Environmental Impact Statement (DOE/EIS-0355D)"

Summary: Recent robust work by the U.S. Geological Survey, State of Utah Department of Environmental Quality, and the University of Utah Department of Geology and Geophysics indicates that a number of the site characterization assumptions made in the DEIS are highly questionable. The 1000-year stability of an in-situ reclamation is far more uncertain than claimed in the DEIS. It is possible that an observer 1,000 years from now would be unable to differentiate the environmental impacts of the No Action and Capping-In-Place alternatives because of containment failure due to site instability.

It would be foolish false economy to spend $166 million on a capping-in-situ reclamation which has a substantial probability of failing. The difference between the DEIS's estimated costs of capping in-situ and moving the tailings to an alternative location ($329-464 million) would quickly disappear in the cost of a failed remediation: damages from toxic release and costs of addressing a cleanup and second remediation effort. We locals are cognizant of the fact that the neighboring Green River tailings were remediated twice and the Monticello tailings were remediated three times under the DOE Title I program. Like the Atlas tailings, the Green River and Monticello tailings were unlined and located on a porous basement structure in a drainage of the Colorado River basin. Both were initially capped in place; both were moved to a lined alternative location away from a drainage for their final remediation when previous efforts did not reduce leachate discharge to acceptable levels.

We think that the assumptions about the difference in groundwater remediation effort duration and costs if the tailings are left in place or if they are removed in the DEIS are incorrect. Oak Ridge Hydrological Laboratory opinion suggests that groundwater remediation with the tailings in place will have to continue far more than 80 years, while remediation efforts under tailings removal alternatives taking 8 years may require less than the 75 years stated in the DEIS. Although design and construction of the groundwater remediation system would be the same $10.75 million, at $906,000 operating cost per annum the cost of groundwater remediation might be considerably cheaper under the tailings removal alternatives and offset the higher cost of relocating the tailings for reclamation.

As detailed below, we have issues with several of the statements made in the DEIS about the

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alternative reclamation sites. In aggregate, we think the characteristics and contingies of use of the current tailings site and White Mesa Mill alternative site for remediation are worse, and the characteristics of the Klondike Flats and Crescent Junction sites are better, than the DEIS evaluation indicates.

If one takes both environmental cost-benefit and the degree of certainty of 1,000-year reclamation stability into account, the best alternative is moving the tailings to the Klondike Flats site by truck; second is moving the tailings to Crescent Junction by rail; third is rail transport to Klondike Flats; fourth is moving the tailings to Crescent Junction by truck; a distant fifth is moving the tailings to the White Mesa Mill by slurry line. Moving the tailings to White Mesa by truck and capping the tailings in place have such large costs and/or risks that we do not consider them acceptable by comparison to these five acceptable alternatives. In a worst case scenario the reclamation in situ alternative calculates as infinitely less cost-effective than the No Action alternative and should be dropped from consideration.

Existing Site Stability Issues

1. River Migration: The DOE's river migration report (a 19-page letter entitled "Migration Potential of the Colorado River Channel Adjacent to the Moab Project Site") suggests that the valley is subsiding more rapidly on the south side of the Colorado River, which would cause the river to migrate southeastward away from the tailings. There are three reasons to disbelieve this report:

1.A. Dr. John Dohrenwend discovered that the comparison of reported positions of the river channel by the DOE from 1944 to date were based on mis-registered overlays of aerial photographs. When historic maps and photographs are accurately registered, it is obvious that since 1924 the south bank of the Colorado has moved progressively north, west, and southwest away from Moab and towards the tailings site. From the U.S. 191 bridge to the tailings site, the south bank has moved north and northwest an average of 320 feet since 1944. Downstream from the tailings, the south bank has moved west and southwest an average of 175 feet. Neal Swisher has suggested some of these changes resulted from diking done by C & W Construction to divert water to the Atlas Mill pump intakes on the north side of the island from the channel on its south. This diking does not explain river bank migration from 1924 to the mid 1960's, which was in the same direction as that from the mid-1960's when diking was done to date.

1.B. At the January Atlas stakeholders meeting, the USGS presented new, robust data on past river migration to the north of its current bed.. The USGS data analysis is far more robust and current than that in the 19-page DOE report. The USGS scientists believe the data shows the river will migrate north, not south, in the future.

1.C. It appears that the fluid dynamics model used by the DOE migration report did not take into account the sediment load in the Colorado River. The capacity of surface water to carry suspended solids is the square of the water's velocity. Water flows faster at the outside of a river curve than at its inside radius. The south bank of the Colorado is on the inside radius of the river's curve opposite the tailings; the river turns from northwest to south almost 90 degrees from the US 191 river bridge to the Portal. The slower current near the south bank will cause greater

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deposition of silt there than on the north side. This deposition makes the channel shallower, creating friction which lowers water velocity. Because of the curve of the Colorado River in its crossing of the head of Spanish Valley, a collapsed salt diapir, it will force itself from the south towards the north because of the fluid dynamics of heavily silted water.

2. Catastrophic flooding: The DOE's geohydrological model for the site assumes the presence of a rock sill underneath the Colorado River at the Portal. In a 300,000 cfs 500-year flood event, the hypothetical rock sides and bottom of the Portal would act as a weir, damming the flow and creating a lake which would rise up around the lower part of the tailings but pose no erosional challenge to the cap because the water would be flowing at very low velocity. This model appears to be wrong because it is based on questionable assumptions.

The State of Utah drilled 150-foot deep cores along the south bank of the Colorado opposite the tailings pile. Kip Solomon and Phil Gardner of the University of Utah report that there is 15-18 feet of silty riverine alluvial deposits on the top. Below these, as deep as was drilled, there is 135 feet of flood-scour coarse gravels with no silty lenses or even smaller gravels: rocks from the size of a thumb up to the size of a human head are typical. Pieces of driftwood buried in this scour gravel were carbon-dated. At a depth of 24 feet, carboniferous materials dated at less than 100 years old. At 35 feet depth, the carboniferous material dated as 900 years old. The presence of uniform scour gravels to a depth of 150 feet indicates high-velocity river flow during flood events; exactly the opposite of the DOE's thesis that a stillwater lake would form during floods due to a choke of river flow at the Portal.

If a theory predicts the opposite of what is in fact observed when measurements are taken, the scientific method requires it be discarded. The weight of the evidence is that the Colorado River was scouring 35 feet deeper than the river bed today within the last 1,000 years, and that it is migrating northwards towards the tailings pile. This introduces the substantial possibility that the river would scour in a flood event, cutting northward and undermining the armor of the toe of the tailings impoundment, causing partial collapse of the cap and release of tailings, within the next 1,000 years.

In combination, we believe the river migration uncertainty and catastrophic flood uncertainties introduced by this new data disqualify the current tailings site as a feasible site for a disposal cell meeting regulatory requirements.

Groundwater Remediation Duration and Cost Issues

The DEIS posits $10.75 million for design and construction of the groundwater remediation infrastructure and $906,000 annually to operate it (S-9). Meeting the DOE target ground water remediation goal of 3 mg/L of ammonia in ground water would require 80 years under the on-site disposal alternative and for 75 years under any off-site disposal alternative (S-13). Since on-site remediation is estimated to take 7-10 years (S-8) and off-site disposal to take 8 years (S-9), the DOE must be assuming that the same lack of infiltration of new leachate into groundwater will

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occur at the point the tailings are capped in situ as would occur when they are completely removed from the site. This assumption has been present in past NRC and Atlas documents concerning the effect of capping the tailings in situ.

The Oak Ridge Hydrological Laboratory examined the leachate plume from the Atlas uranium tailings in 1997 at the request of the U.S. Fish and Wildlife Service and paid for by the Council on Environmental Quality. The NRC paid the Oak Ridge scientists to model the effects of the capping on discharge from the pile into the leachate plume. The report, "Tailings Pile Seepage Model: The Atlas Corporation Moab Mill, Moab, Utah" dated January 9, 1998, concluded that capping the pile would have no effect whatever on the discharge rate of leachate into the indefinite future. The reason was that the recharge rate of rainwater into the tailings through the clay cap would match the rate of infiltration of water through the upper tailings. In the words of the report, the "unsaturated hydrologic conductivity" of the fine tailings at the top of the pile are "sufficient to conduct the total volume of recharge through the pile." The laboratory found the moisture content of the tailings is 0.63 at the top of the pile, 0.75 at the bottom, and 0.71 overall. If moisture content was lowered to 0.57, there would still be 426 million drainable gallons of water in the tailings. Oak Ridge additionally found that the embodied water in the tailings was very tightly bound in the fine (-100 grit) tailings, or "slimes," was unlikely to enjoy significant recovery by the dewatering wells or "wicking," instead discharging for 270 years even if the top of the tailings pile was hermetically sealed so no additional water infiltrated. Finally, Oak Ridge flatly stated in the report that the capped pile would continue to violate groundwater standards with its leachate indefinitely - meaning for longer than the 1,000-year regulatory framework.

The DEIS does not address or refute these findings by the Oak Ridge hydrologists who did the groundwater hydrology work on the 24 DOE Title I uranium tailings reclamations and are arguably the standing experts on the subject. Absent substantial refutation based on sound new information, we conclude the estimate of 75 years for groundwater remediation if the tailings are removed is probably accurate, but an accurate estimate for how long groundwater remediation would have to continue at the site if the tailings were present is more on the order of 270 years (S-37 "more than 200") than 80 years. (This assumes alternative concentration limits would be employed; the DEIS analysis assumes the leachate would violate standard concentration limits for more than the 1,000-year regulatory framework.)

We also note that the State of Utah and Oak Ridge found that levels of molybdenum are very high (1000-2000 micrograms/liter range); selenium is high (95.3 ug/L) close to the pile - moving slowly in the alkaline environment; sulfate is present in concentrations exceeding 12,000 mg/L in the plume; and uranium, largely as uranyl carbonate ion was 2.68 and 6.76 mg/L in two test wells, and Oak Ridge stated that a level of 2.8 mg/L of uranium would persist in groundwater downgradient of the tailings "indefinitely." G.K. Eddlemon of Oak Ridge reported that "...both water quality data and measured redionuclide concentrations in fish indicated substantial enrichment in certain redionucides originating in the tailings pile [Polonium-210, Thorium-230, and Uranium-238; Po-210 was responsible for 80%]". There is no mention of these other contaminants as being of any significance biologically or otherwise. This is an important omission

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if we are considering the biological risk of cumulative impacts of continued tailings pile leaching over 270 years.

Finally, we note (S-45) uncertainty number 18, acknowledging there is probably an ammonia salt layer in the tailings. (The lower part of the tailings is the residuum of the Mi Vida pitchblende ores reduced by an alkaline process, the upper part is the residuum of Vanadium-type ores reduced by an acid process, making the Atlas tailings chemistry uniquely complex.) The DEIS assumes that this salt layer would be dissolved and reach groundwater no sooner than 1,100 years, which is beyond the regulatory life span of the disposal cell. This time scale is also based on the assumption that the cap will stop rainwater infiltration, while Oak Ridge found the cap will not do so. If Oak Ridge is right, this ammonia salt layer could reach groundwater within the regulatory life span of the disposal cell. This event would fail to meet regulatory requirements for reclamation.

This unusual chemical reduction circuit and feedstock history of the Atlas tailings also raises the uncertainty of the tailings characterization employed by the DOE (S-37). Tailings moisture content and driability, particle size distribution, and the concentrations of organic and inorganic contamination through the pile are likely to vary widely as a function of the ore being processed and the reduction circuits being used at the time a particular slurry of tailings was discharged into the tailings pile. Various former Atlas workers and suppliers report that the tailings impoundment was used for disposal of various hazardous wastes by local mining, construction, and drilling concerns as a courtesy by Atlas management. This variability in tailings pile content raises uncertainty and risk for both in-situ reclamation and any slurry line relocation alternative.

Klondike Flats Relocation Site Issues

1. Land Use: We believe the DEIS mis-characterizes the impacts of use of this 435-acre disposal cell site on grazing and cultural resources. The Klondike Flats site recommended by Grand County is a Mancos Shale badlands with a grade below the threshold for sheet erosion. Groundwater percolation rate measured by Geologist Bob Norman in the 1970's when evaluating the site for Potash evaporation pond use is 1/100th of an inch per year. His bores indicate the shale is about 900 feet thick. Static fossil groundwater underneath and in pockets in the shale is so saline and full of heavy metals that the tailings leachate has better water quality. Consequently there is almost no vegetation on the site. The few plants there are are highly salt-adapted and not palatable to either domestic livestock of wild game species. The area is therefore likely to lack any cultural sites because Native Americans had no more reason to go there to hunt than current citizens have to go there to hunt or graze livestock.

2. Recreational conflict: The Blue Hills road which leaves US 191 south of Canyonlands Field is used somewhat as a recreational access, primarily to the Ten Mile Canyon area to the northwest. Most recreation use is along the Mill Canyon road just to the south of Courthouse Wash. Mountain bicyclists use numerous camping areas along the Wash and ride to the south and west into Courthouse, Mill, Tusher, and Bartlett Canyons, the Disappointment Towers area, and

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around the Sevenmile Rim recreation area. Thus, most recreational traffic and camping use in the area is a couple of miles south of the roadway to the Klondike Flats disposal cell site. There is some potential for recreational use conflict if the Blue Hills Road itself was used as a truck haul route; alternative access to the Ten Mile Canyon complex exists through the Dubinky Well road.

3. Visual impact, latent cancer risk: The Klondike Flats site recommended by the county is, as the DEIS correctly states, the lowest in visual impact on the fewest viewers among the alternatives. We think that the stated latent cancer risk of 0.09 in 1000 years is high. We can see no reason that actual exposure of people to the tailings would be any greater than at the Crescent Junction site, which projects 0.07 latent cancer risk for a disposal cell there.

4. Borrow material demand: The Mancos Shale at the Klondike Flats meets disposal cell liner requirements if roller-compacted. Per 40 CFR 192 which specifies below-grade reclamation of tailings, the county has long proposed that the tailings be impounded at this site by excavating receiving cells in the shale, roller-compacting the bottom, filling the cell with tailings, then covering the tailings with the reserved excavated shale/clay, molding the thick cap to a grade below the threshold of sheet erosion. This reclamation design would not require any borrow material to be hauled into the site. With a cap below the grade for gully erosion, no rip-rap would be needed to stop such erosion. The roller-compacted Mancos Shale cap would have the same percolation characteristics as the proposed clay cap in the in situ reclamation alternative. Hauling in revegetation matrix soil from Floy Wash to this site to revegetate it would result in an incongrous patch of elevated vegetation in a sea of barren Mancos Shale badlands. There is no technical reason to keep the minimal amount of rainwater which would percolate through the flat cap out of the "bathtub" full of tailings which would have at least a .57 moisture content to begin with (per Oak Ridge).

Crescent Junction Relocation Site Issues

1. Transportation to site: The Crescent Junction site would require a shorter rail spur to access from existing rail lines than the Klondike Flats site would. It is a longer haul by truck than Klondike Flats. The stakeholders group dismissed the idea of hauling by rail to Klondike Flats because the cost of loading and unloading facilities for rail haul were higher than the cost of loading, unloading, and transport by truck to that site. Once tailings are loaded on a rail car, the cost per mile for transport is very small relative to truck transport primarily because of differences in fuel, labor, and depreciation. No analysis was done to see if the cost of rail transport the further distance to Crescent Junction balanced out the greater cost of truck transport to this more distant site. The advantages of rail transport in terms of traffic safety, road depreciation, and pubic exposure are such that, if rail transport to Crescent Junction would cost about as much overall as truck transport to Crescent Junction, the virtues of the Crescent Junction disposal cell site and the advantages of rail transport would make rail relocation to Crescent Junction the preferred alternative.

2. Land Use: We believe the DEIS exaggerates the impact of use of this 435-acre disposal cell

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site on grazing but is probably correct concerning cultural resources. The Mancos Shale badlands at Crescent Junction have an overlay of erosional outwash from the Book Cliffs and therefore supports more vegetation than the Klondike Flats badlands. Groundwater percolation rate of the deeper shale is probably 1/100th of an inch per year as at Klondike. The shale is believed to be over 1,000 feet thick, substantially more than at Klondike. Static fossil groundwater underneath and in pockets in the shale is probably so saline and full of heavy metals that the tailings leachate has better water quality. Because of proximity to the Book Cliffs and some browsable vegetation, the area is far more likely than Klondike to contain cultural resources because of Native American hunting use. The area is considered to have very poor grazing utility because of lack of palatable forage species for domestic livestock and lack of water.

3. Visual impact, latent cancer risk: We think the DEIS analysis of visual impact of reclamation in a disposal cell at Crescent Junction is correct, if an above-grade reclamation is used (S-19). As with Klondike flats above, we recommend consideration of a below-grade reclamation. We think that the stated latent cancer risk of 0.07 in 1000 years is correct for this site

4. Borrow material demand: The Mancos Shale at Crescent Junction probably meets disposal cell liner requirements if roller-compacted. Per 40 CFR 192 which specifies below-grade reclamation of tailings, the county has long proposed that the tailings be impounded at Mancos Shale sites by excavating receiving cells in the shale, roller-compacting the bottom, filling the cell with tailings, then covering the tailings with the reserved excavated shale/clay, molding the thick cap to a grade below the threshold of sheet erosion. This reclamation design might not require any borrow material to be hauled into the site. With a cap below the grade for gully erosion, no rip-rap would be needed to stop such erosion. The roller-compacted Mancos Shale cap would have the same percolation characteristics as the proposed clay cap in the in situ reclamation alternative. Hauling in revegetation matrix soil from Floy Wash to this site to revegetate it might not be necessary if enough Book Cliffs outwash soil is available and reserved for cover from the disposal cell site and immediate vicinity.

5. Use conflicts: There is currently no use of this area by mountain bikers or 4WD tourists. The road from Crescent Junction across the Christmas Hills to Floy Wash is used by stockmen, hunters, and others accessing Floy and some other canyons into the Book Cliffs. The major potential conflict, which the DEIS mentions, is with industrial uses in the industrially-zoned area of Grand County immediately to the east of the Crescent Junction site, particularly with already-approved activities: pipeline construction and building a pumping/offloading complex by Williams Petroleum Products. This needs to be carefully evaluated since there are no apparent use conflicts associated with the Klondike Flats site.

White Mesa Uranium Mill Relocation Site Issues

1. Cultural Resources: The DEIS correctly states that many cultural resource sites are likely to be impacted by both the disposal cell site at the White Mesa Mill and along the slurry pipeline route. The White Mesa Utes recently stated an estimated 120 National-Register-eligible sites would be

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obliterated.

2. Groundwater hazard: Unlike the Klondike Flats or Crescent Junction sites, which are in an impermeable basement geologic structure with no freshwater below at any distance, the White Mesa Mill disposal cell overlies an aquifer in the Burro Canyon Formation which is used for water by the Mill and discharges in springs and seeps used by wildlife. The Glen Canyon Group of sandstones are further down, and comprise the water supply for the White Mesa Ute community 4.5 miles southeast which is geologically and hydrologically downgradient from the millsite. The Mill uses artificial liners for its uranium tailings disposal cells. One has already leaked.

We also have the risk of contamination of various areas along the high-pressure slurry pipeline route in event of a leak or rupture. Kane Creek, Muleshoe Creek, West Coyote Creek, and Hatch Wash are among the larger drainages crossed by the pipeline route; the first two have perennial flow. An additional risk point is the booster station 30 miles south of Moab.

3. Truck transport: Combined with other site and cost disadvantages, the increase in average daily truck traffic through Moab of 127% if the tailings were trucked to White Mesa from Atlas makes this alternative totally unacceptable.

Respectfully submitted,

Richard Lance Christie

Richard Lance Christie, President, Board of Trustees
Chairman, Grand County Atlas Uranium Mill Tailings Reclamation Task Force, 1989-present
(Appointed 1989 by the Grand County Commission; re-appointed 1993 by the Grand County Council)

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